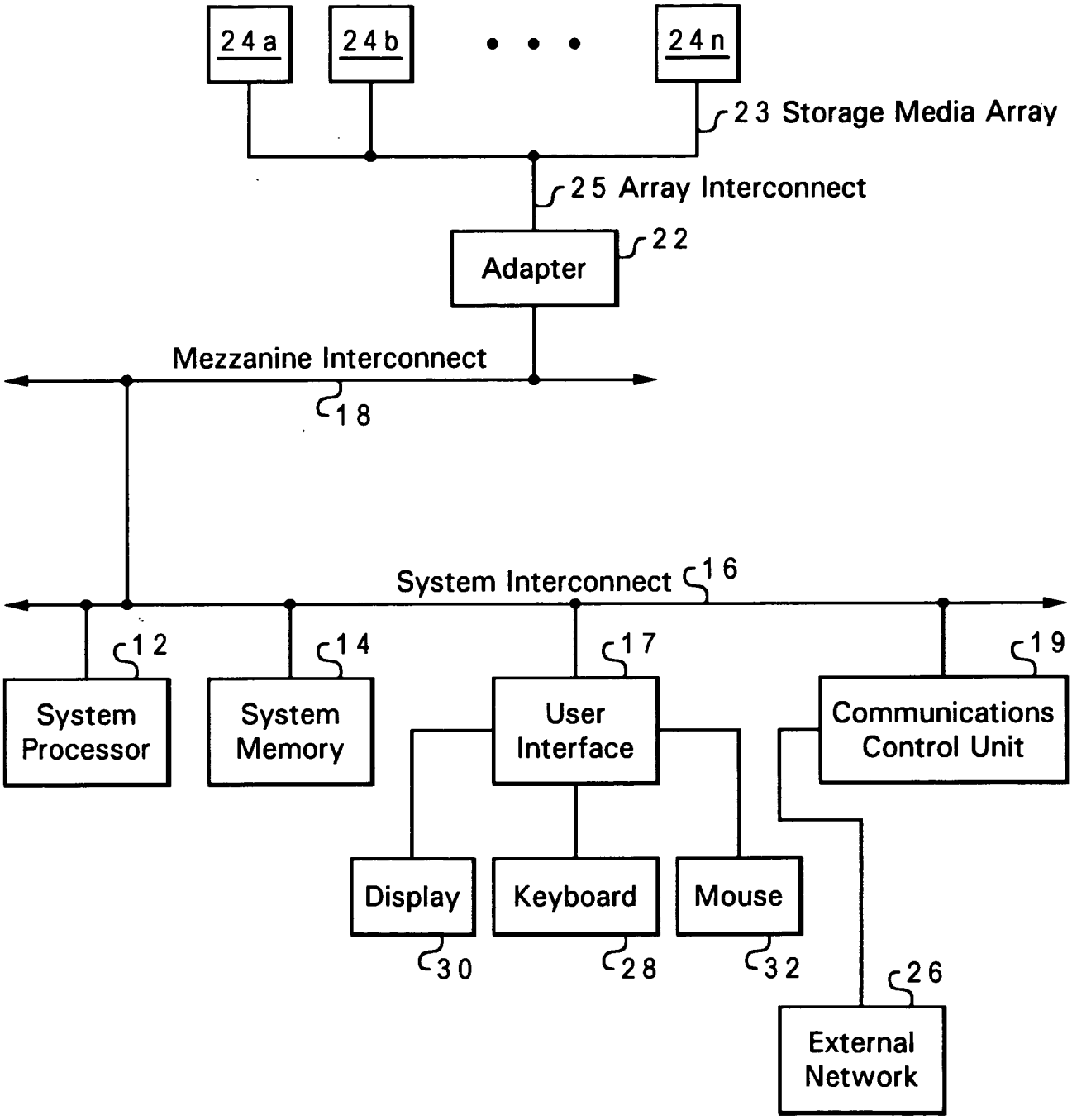


Data Processing System
10

Fig. 1

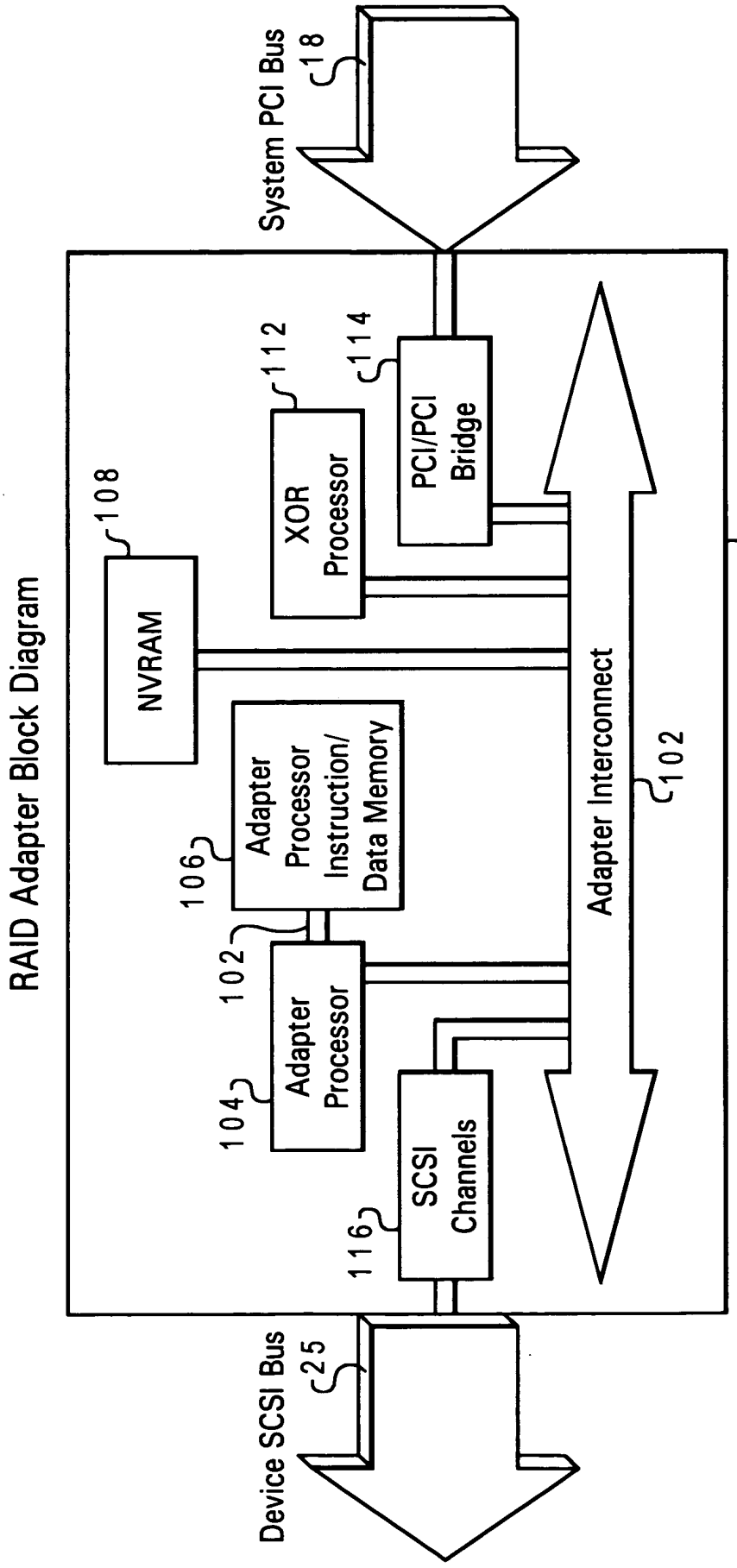
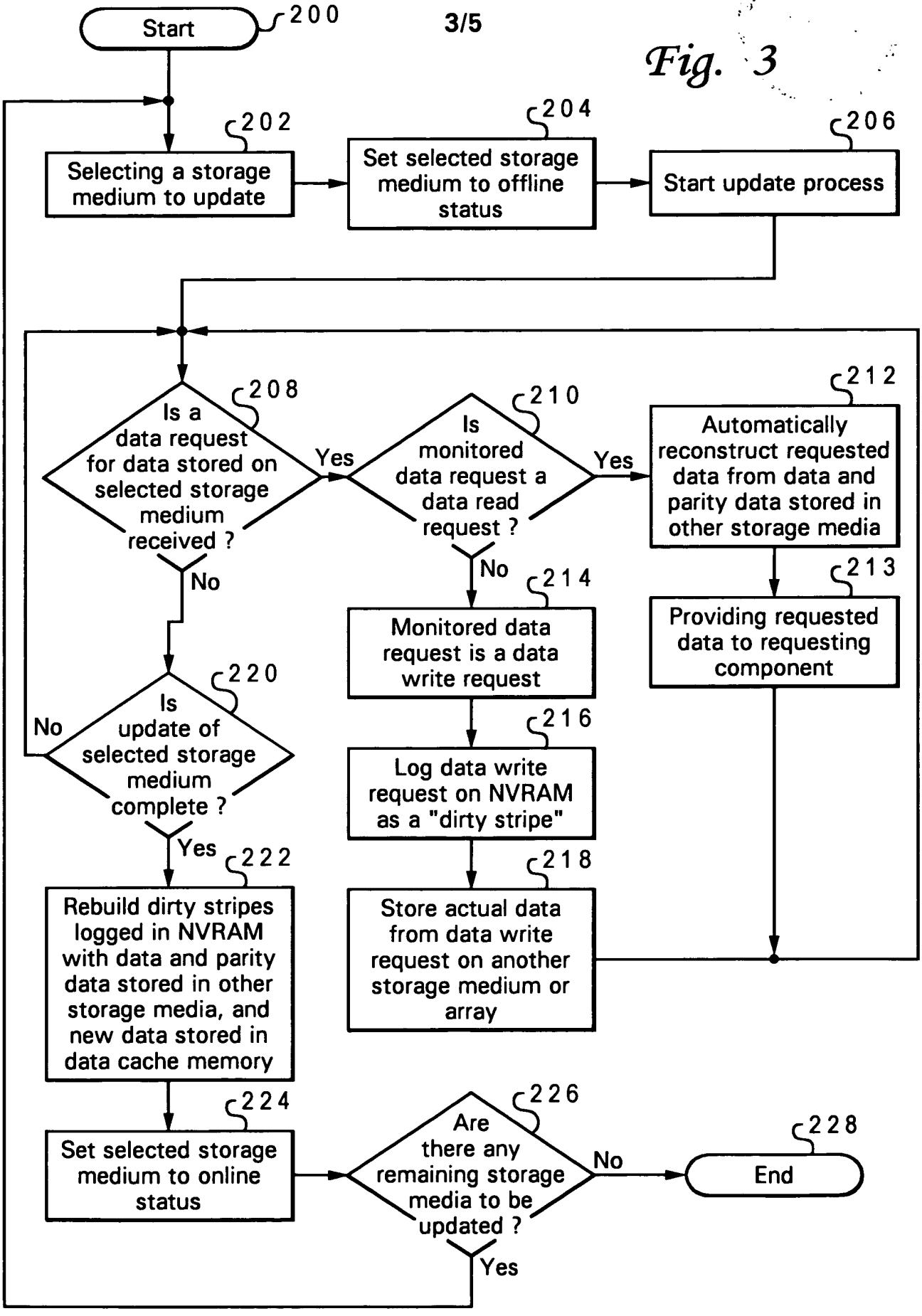

RAID Adapter Block Diagram
System PCI Bus
18
Device SCSI Bus
25
NVRAM
108
XOR Processor
112
PCI/PCI Bridge
114
Adapter Processor Instruction/ Data Memory
106
Adapter Processor
102
104
SCSI Channels
116
Adapter Interconnect
102
22

Fig. 2

Fig. 3


Start
200
202
Selecting a storage medium to update
204
Set selected storage medium to offline status
206
Start update process
208
Is a data request for data stored on selected storage medium received ?
Yes
No
210
Is monitored data request a data read request ?
Yes
No
212
Automatically reconstruct requested data from data and parity data stored in other storage media
213
Providing requested data to requesting component
214
Monitored data request is a data write request
216
Log data write request on NVRAM as a "dirty stripe"
218
Store actual data from data write request on another storage medium or array
220
Is update of selected storage medium complete ?
No
Yes
222
Rebuild dirty stripes logged in NVRAM with data and parity data stored in other storage media, and new data stored in data cache memory
224
Set selected storage medium to online status
226
Are there any remaining storage media to be updated ?
No
Yes
228
End

(Updating)

STRIPE NUMBER	STORAGE MEDIUM 1	STORAGE MEDIUM 2	STORAGE MEDIUM 3
1	D0	D1	P1
2	D2	P2	D3
3	P3	D4	D5
• • •	• • •	• • •	• • •
N	DN	PN	DN+1

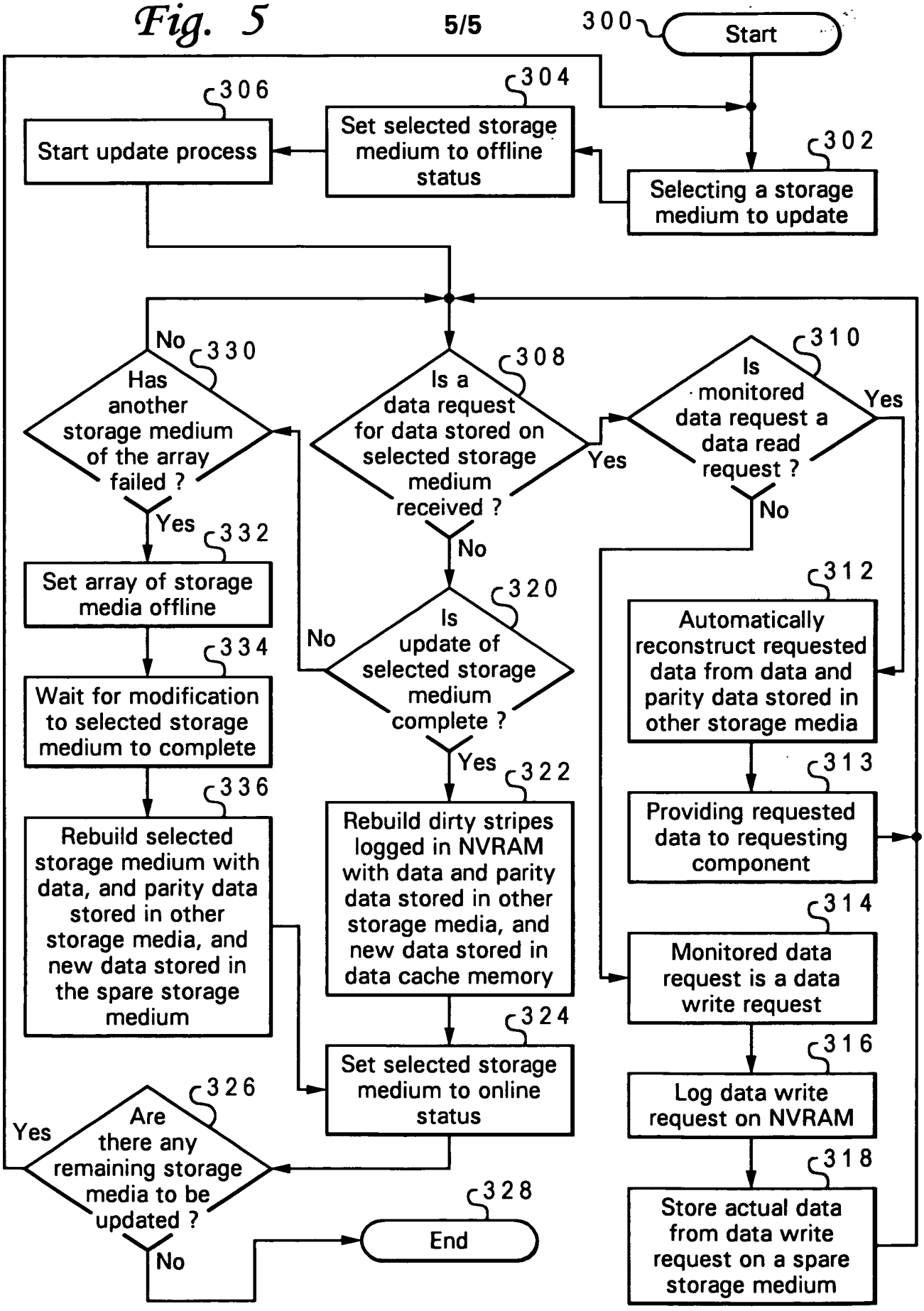
Fig. 4A

(Updating)

STRIPE NUMBER	STORAGE MEDIUM 1	STORAGE MEDIUM 2	STORAGE MEDIUM 3	SPARE STORAGE MEDIUM 4
1	D0	D1	P1	D1'
2	D2	P2	D3	
3	P3	D4	D5	
• • •	• • •	• • •	• • •	• • •
N	DN	PN	DN+1	

Fig. 4B

Fig. 5


300
Start
302
Selecting a storage medium to update
304
Set selected storage medium to offline status
306
Start update process
308
Is a data request for data stored on selected storage medium received ?
Yes
No
310
Is monitored data request a data read request ?
Yes
No
312
Automatically reconstruct requested data from data and parity data stored in other storage media
313
Providing requested data to requesting component
314
Monitored data request is a data write request
316
Log data write request on NVRAM
318
Store actual data from data write request on a spare storage medium
320
Is update of selected storage medium complete ?
No
Yes
322
Rebuild dirty stripes logged in NVRAM with data and parity data stored in other storage media, and new data stored in data cache memory
324
Set selected storage medium to online status
326
Are there any remaining storage media to be updated ?
Yes
No
328
End
330
Has another storage medium of the array failed ?
No
Yes
332
Set array of storage media offline
334
Wait for modification to selected storage medium to complete
336
Rebuild selected storage medium with data, and parity data stored in other storage media, and new data stored in the spare storage medium